

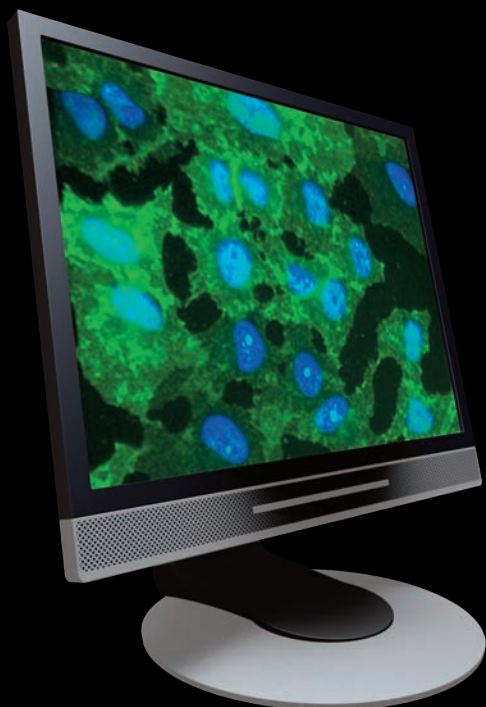
IMAGE ANALYSIS SOLUTIONS

APPLICATION TO BIOLOGY



IMAGE PROCESSING AND DATA ANALYSIS PROVIDE VERY USEFUL TOOLS FOR BIOLOGICAL APPLICATIONS. THE MICROSCOPE IMAGE CONTENTS ARE DESCRIBED USING ADAPTED AND CUSTOMIZED FEATURES (*TEXTURE, COLOR, GREY-LEVEL, SHAPE...*). THE OBTAINED IMAGE INFORMATION IS THEN CLASSIFIED USING DATA ANALYSIS AND VISUALIZATION METHODS.

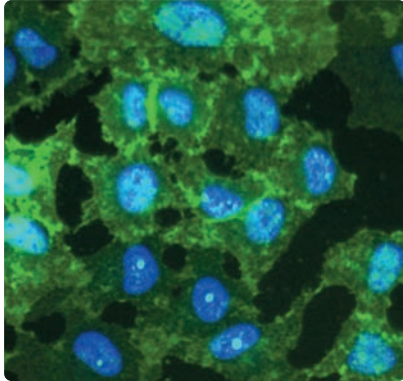
CLIENTS CAN ALSO SEND THEIR OWN IMAGES FOR ANALYSIS IN ORDER TO OBTAIN THE QUANTITATIVE DATA OF INTEREST FROM THEIR EXPERIMENTS.





Cellular segmentation

In order to perform cellular image analysis, cell segmentation, a labeling process of each cell, is an essential and necessary step. Fluofarma's image analysis tools are able to process several techniques of staining — immunofluorescence (*IF*) or immunohistochemistry (*IHC*) — applied to different biological materials (*cells, tissue sections, TMA ...*).



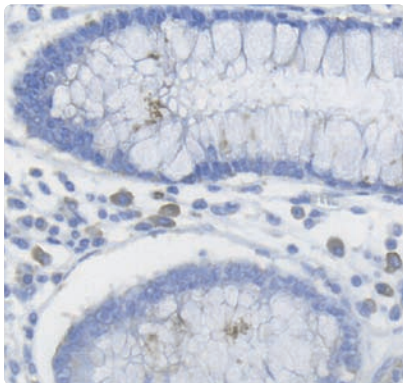
IF image



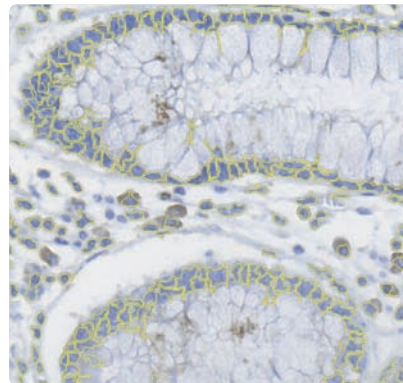
Nuclei segmentation



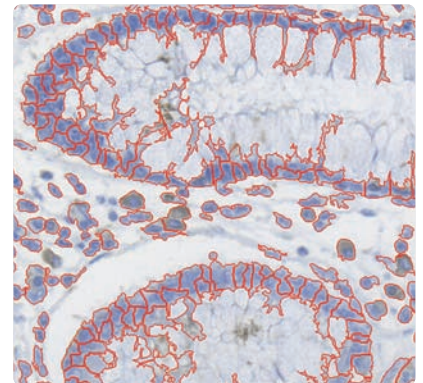
Cytoplasm segmentation



IHC image



Nuclei segmentation



Cytoplasm segmentation

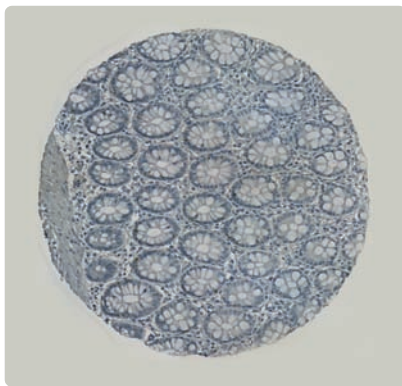
Using segmentation information, different characteristics can be measured such as Intensity or Counting. A cell classification can also be achieved using custom features that characterize subcellular objects inside nuclei or cytoplasm.

Fluofarma's expertise can also be used to manage particular cases, such as neuronal cells. Pertinent features linked to neuronal biology can be extracted and proposed according to the needs of client studies.

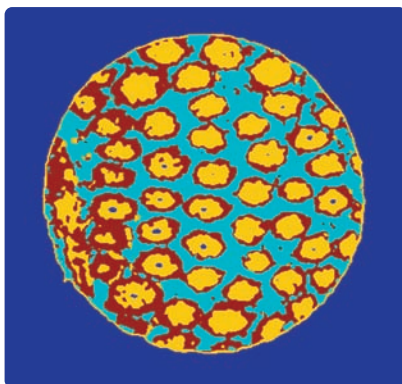
Texture analysis for image quantification

Texture analysis methods provide high level features that allow for a robust and a precise description of an image. These tools are routinely exploited in biology for tissue segmentation and are very useful for any application domain including oncology, inflammation, etc. Two examples of image segmentation, for Regions Of Interest (ROI) detection, are presented below:

↓ Detection of macro-structures inside colon images acquired using colon TMA in which each core was analyzed individually

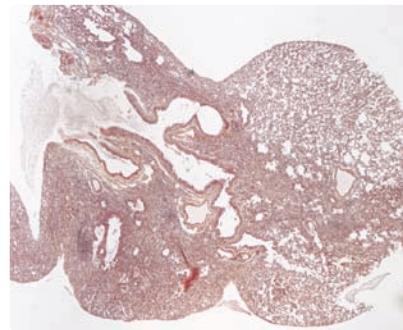


Colon image

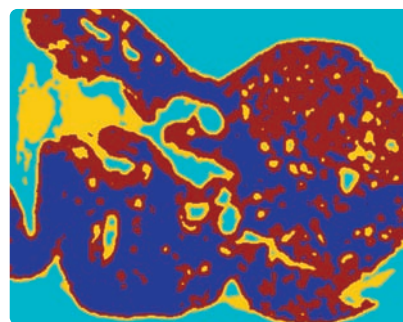


Macro-structures detection
(ROI in yellow)

↓ Detection of the fibrotic area to provide a fibrotic percentage inside lung tissue sections

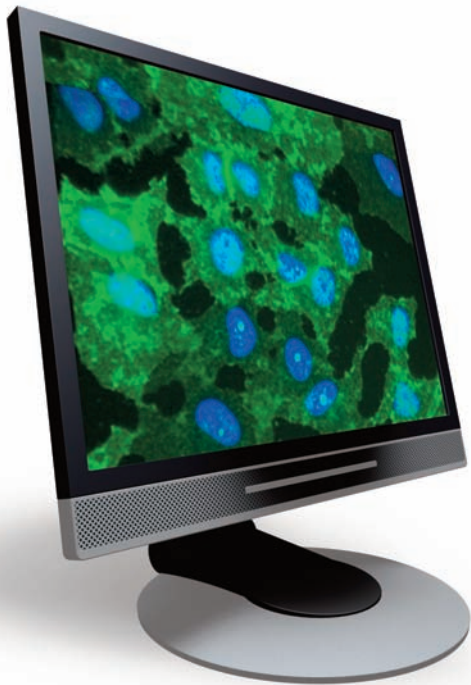


Lung image



Fibrotic area detection
(ROI in navy blue)

Based on the labeling of the different regions inside an image, it is possible to extract information and thereby describing the image content: ROI percentage, custom indices to help pathologist diagnostics, tissue structures description.



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